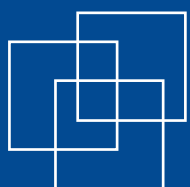




International
Labour
Organization



**Food and agriculture
global value chains:
Drivers and constraints
for occupational safety
and health improvement**
Volume Two
Three case studies





Food and agriculture
global value chains:
Drivers and constraints
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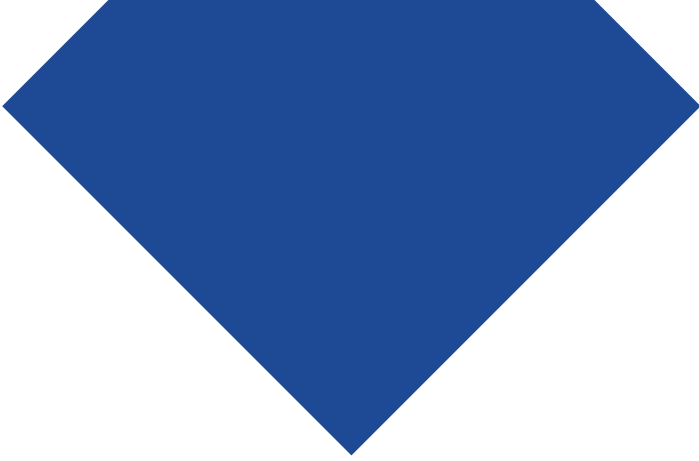
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A case study of drivers and constraints for OSH in the lychee global value chain from Madagascar

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Acronyms

BRC	British Retail Consortium
CIRAD	<i>Centre de coopération internationale en recherche agronomique pour le développement</i>
CNAPS	National Social Welfare Fund
CTHT	<i>Centre Technique Horticole de Tamatave</i>
COLEAP	Europe-Africa-Caribbean-Pacific Liaison committee
EU	European Union
EU-ACP	European Union - African, Caribbean and Pacific (ACP) region
GAP	Good Agricultural Practices
GEL	Lychee exporters group
GEPAT	Regional Employers Organization of Toamasina
GRASP	GLOBALG.A.P. Risk Assessment on Social Practice
GSCs	Global supply chains
IFS	International Featured Standard
ILO	International Labour Office
MRL	Maximum Residue Limit
OMSI	Inter-professional Medical and Social Organization
OSH	Occupational safety and health
PIP	Programme Initiative Pesticides (Pesticide Initiative Programme)
PPE	Personal Protective Equipment
SAME	Independent Medical Services
SMIE	Inter-company Medical Services
SO ₂	Sulphur dioxide
TnT	Tranoben'ny Tantsaha
WHO	World Health Organization

1 | The supply chain of lychee from Madagascar

1.1. Market and product

Market

Global demand for exotic fruits has grown over the past decades, linked with an overall increase in world population and changing consumption patterns, particularly in Europe and North America (European Parliament, 2015). Indeed, exotic products, and in particular exotic fruits, have become a regular part of the European and North American diet. This change coincided with the concentration of retailers who first provided an extended range of products, including various fresh and exotic products to western consumers. These products seem to assume a new strategic importance in the differentiation of the customer experience sought by retailers (McKinsey and Company, 2013).

In this context, beginning in the early 1990s, a market for lychee emerged in Europe and North America. Initially widely consumed in Asia, lychee started gaining popularity in Europe due to: i) a growing trend towards consuming more exotic products; and ii) a combination of regulation and access to technology that allowed for importing fresh fruit during the European holiday season. Duty-free and quota-free EU market access under the European Union - African, Caribbean and Pacific region (EU-ACP) agreements as well as the marketing of lychee as a Christmas fruit greatly fostered this trend. The market for lychee juice and canned lychees has also increased in the European Union and Switzerland, with a focus on fair trade and organic products. The US market, given a national regulation, does not allow lychees imported from Madagascar because they are sulphur-treated.

Product

Lychee, from the *Sapindaceae* family, is native to China. It is a rough, red pericarp fruit and contains a perfumed and sweet translucent pulp and brown seed. The most common varieties have a diameter of between 28 and 34 millimetres. The total weight of the fruit is about 20 grams and the pulp, the only consumable part, represents approximately 60 per cent of its total weight. The fruit is consumed fresh or processed as canned fruit or fruit juice.

The lychee tree is acclimatized to humid, tropical zones. Its size can reach 15 to 20 metres, but when cultivated in orchards and regularly pruned, its size stabilizes to between 3 to 5 metres. Depending on growing conditions, the tree usually yields fruit 5 years after planting and reaches full production after 10 years. As an evergreen tree, its growth is continuous with "Y" branches. Flowering coincides with the annual drop in temperature. The average yield of an adult tree varies from 50 to 100 kilograms of fruit each year. Consequently, the production period differs between the production zones located in the northern hemisphere (winter in January and February) and those in the southern hemisphere (winter in July and August).

Only lychees produced in the southern hemisphere can supply the end-of-year holiday markets in Europe. Over 80 per cent of lychee imported by the European Union is from Madagascar. The main competitors of the southern hemisphere on the EU market are South Africa and to a lesser extent Mauritius, Reunion and recently Mozambique. These countries benefit from the same production season as Madagascar, but currently have less production capacity.

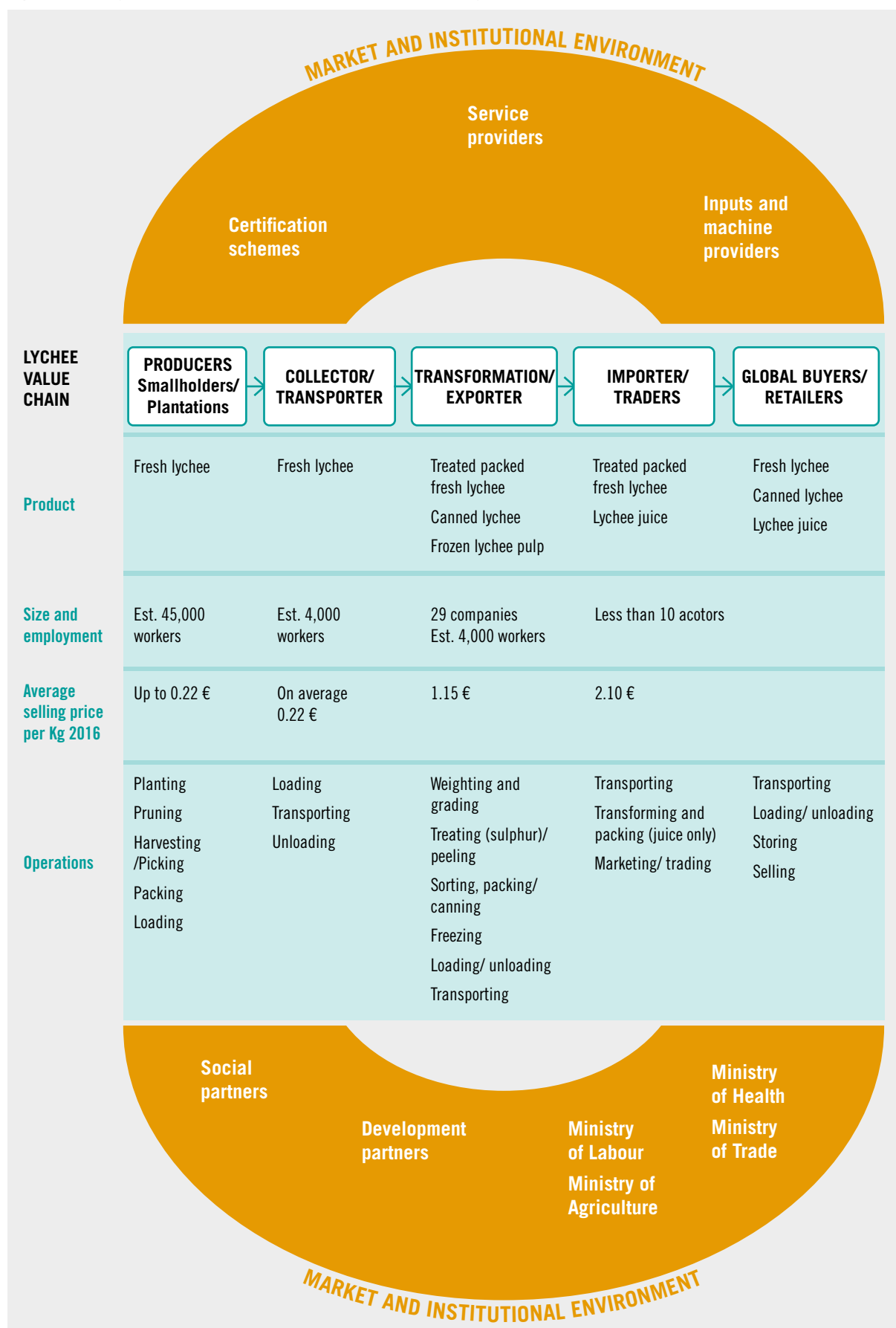
1.2. Value chain structure

The vast majority of lychees are marketed fresh and are destined for the European Union, however, lychee is marketed for export in three forms:

- Fresh lychee (about 20,000 tonnes transported by ship and to a lesser extent, by air, for early sales (29 exporting companies);
- Canned lychee (about 250,000 cans exported to Switzerland and the European Union per year, one transforming / exporting company);
- Lychee pulp (about 2000 tonnes exported frozen to the European Union and South Africa, four transforming / exporting companies).

The supply chain varies according to the processing method, but the production and collection for the three types of export remains substantively the same. Small holders grow the fruit, which is gathered by collectors or transporters before going through treatment or transformation stations. The majority of fruit is shipped to Europe by boat.

Figure 19. The lychee value chain and its market and institutional system



Source: authors based on collected information.

Producers

Producers with access to the export market are those located within a 100-kilometer radius of Toamasina. Beyond this perimeter, transport conditions do not allow access to the market. All of the lychee processing and treatment stations for export are concentrated in Toamasina, which benefits from a deep, water port.

Figure 20. Map of Madagascar and localization of Atsinanana and Analanjirofo regions.



Source: authors (empty map from Wikipedia).

It is important to mention that the potential for Madagascar lychee production is much wider with a large share of its production occurring in the South (Mananjary, Manakara, and Fort Dauphin). Access to the international market, however, is not yet possible due to a lack of appropriate infrastructure. It is estimated that about 25 per cent of Madagascar's annual lychee production is exported (mainly to Eu-

rope), 5 per cent is processed and the remaining 70 per cent is marketed and consumed locally.

Quantifying the exact number of producers involved in the export of lychees is challenging (Jahiel et al., 2014). Exporters have historically relied on a network of collectors who bought fruit from producers in the region, transported the fruit to the processing station, and sold it to the exporter with a profit margin. These collectors benefited from an advance from exporters that allowed the latter to guarantee a given volume of fruit during the limited time allocated for export. This configuration makes traceability to the producer difficult. However, the situation is currently changing as the Global GAP certification process progresses. In this new configuration, exporters, in order to be certified, must be able to trace the product back to the producer. This means the exporter and the producer establish a more direct relationship. An evolution of the role of collectors to that of transporters receiving a fixed remuneration should also assist transparency.

Little statistical data is available on lychee producers involved in export chains. However, general characteristics emerge. There are a few plantations, which tend to be small and vertically integrated with exporters. The majority of lychee production comes from small producers of very different sizes (between two and up to 100 lychee trees). Small producers are not historically organized and there are few co-operatives or producer associations. The seasonality of the product and the lack of inputs, in particular agro-chemicals, explains to some extent the few incentives for organization at the level of producers in cooperatives or associations. For the organic and fair production of lychee, a single cooperative is the only supplier to date. The cooperative is made up of just under 500 small producers, 90 per cent of whom are lychee producers (on average cooperative members own 2.5 lychee trees and always less than 10 hectares of land). With the growth of the Global GAP certification, producers have to organize themselves into groups of cooperatives or associations.

Historically, the primary function of producers was to bring together the lychee harvest and ensure its sale to the collectors. There are few practices of maintenance and replanting of trees in Madagascar and the production of lychee is not professionalized. Producers do not fertilize trees and their limited resources hinder access to inputs (fertilizers, pesticides) and tools or any form of mechanisation. Replanting is seldom done, and in order to replant, growers trans-

plant trees. The purchase of lychee trees at nurseries does not appear to be the norm.

The quality and size of fruit and the efficiency of the harvest are affected by all the above-mentioned practices. In fact, Madagascar's producers struggle to grow sufficiently sized fruit for export (28 to 30 millimetres in diameter). Inadequate renewal also affects the quantity and quality of harvested fruits as does a lack of regular tree maintenance. Subsequent tree height makes collection less easy and affects labour productivity and occupational risks during collection. Although the actors note these considerations, problems with quality encountered at the production stage do not seem heavily sanctioned by the market. Indeed, Madagascar lychees are the most abundant in the southern hemisphere, and consequently competition for the Christmas market is relatively low, although new entrants, such as South Africa and Mozambique, are beginning to emerge.

There appears to be little practice of contract farming, therefore the producers themselves make investments. Access to financial services and saving capacities of producers are limited and their income is both uncertain (they have little control over prices) and irregular (seasonal) without access to financial products to smooth out their income over the year. For producers, the sale of lychee for export can represent 30 to 40 per cent of the household annual income. Other activities are mainly concentrated in food crops (banana, rice) and other export crops, such as clove, pepper, mango and vanilla.

Though it is not possible to know the exact number of producers involved in the export value chain, it is estimated that about 45,000 workers are involved at the producing stage.¹⁰² While some permanent jobs exist for plantation workers, these jobs are by definition seasonal and include a few working days per year for the maintenance of plots (compulsory for certified plots). A large part of the workforce involved in the collection of lychees consists of small producers and their direct family members (paid or unpaid). The structure of employment depends largely on the size of the farm, but it seems that as soon as the plot has more than 3 to 4 trees, producers tend to rely on agricultural workers for the harvest. The

few plantations that exist also use seasonal agricultural workers to support the harvest period.

This part of the value chain is largely in the informal economy and works both for the export market and for the local market. The greatest difficulties in certification of producers relate to the difficulty of producing employment contracts for agricultural workers and family members employed by farmers, especially for small producers. The lack of formalization and the weakness of rural infrastructure mean that workers have very little protection and access to basic services (i.e. health, trainings and sanitation, etc.).

Collectors and transporters

Collectors are composed of a combination of: i) transporters, many of whom come from Antananarivo for the season with their vehicle; and ii) lychee producers with the means to rent a vehicle for the season. Collectors receive cash advances from exporters to buy fruit from producers and then resell it to the exporter. In the absence of easy access to credit for rural households, this solution makes it possible for collectors to secure the minimum investment required for collection. It also allows exporters to guarantee a certain level of fruit provision to be processed and packaged while refrigerated vessels are docked in the port of Toamasina.

At the collection point, collectors must be able to appreciate the weight and quality of fruit presented by producers to ensure that exporters do not buy at a price that causes them any financial loss. Indeed, no weighing instrument is used at the collection point and the traditional mode of packaging (the *garaba*, which weighs between 20 and 30 kilograms) is different from that used by treatment and transformation stations for weight evaluation (crate of about 18 kilograms). Hence, there is an incentive on the collector's side to negotiate down the price of the *garaba* of fruits purchased from the producer to ensure his or her own profit margin.

It is difficult to estimate the number of collectors, especially since some collectors are also producers. However, it is possible to estimate the number of carriers required for transport between collection points and stations and then stations to port, according to

¹⁰² To the extent that the tonnage exported is known and data was collected on the productivity of harvesting work, it is possible to estimate the volume of employment required for harvesting. Based on an average of 100 kilograms harvested per day per worker, a volume of about 45,000 workers is required to ensure the harvest of the exported fresh lychees over five days of collection.

tonnage. This calculation yields an estimate of more than 4,000 workers.¹⁰³ Additionally, as mentioned earlier, this function is evolving into that of a fixed-rate transporter with the progress of the Global GAP certification process. This supply chain model was applied in the framework of fair trade production.

Transporters are to be remunerated, in line with the legislation, if they work within the framework of certified supply chains (Global GAP, organic, Fair Trade). They are regarded as formal workers and in theory are covered by social security for the duration of their contract. In general, the transport functions are outsourced to specialized companies for the duration of the season.

The status is different for non-certified supply chains where employment status and remuneration vary greatly. In particular, remuneration depends directly on the collector's ability to generate a margin between the buying price from producers and the selling price at the station. The selling price at the station per kilo is generally twice the price paid to the producer, and collectors have their own costs (transport, *garaba*, fruit eliminated at sorting stage in the station). The purchase prices offered at the station to collectors fluctuate during the season. Prices vary from day to day depending on the level of supply and the loading speed of export vessels.

Transformers / exporters

The market for fresh lychees exports to the European Union and Switzerland constitutes the majority of the market for Malagasy exporters. The market is shared among a limited number of exporters (29) who are also the actors in charge of the sulphur treatment and packaging of fruit as well as processing (for canned lychee and lychee pulp). This activity is seasonal (roughly one month a year), however each exporter has its own economic model, with some having activities the rest of the year based on their installed capacity, for example, use of existing equipment and buildings. Others do not. Lychee exporters are grouped together as the Lychee Exporters Group (GEL).

The main functions of exporters of fresh lychees are sorting, treating, and packing and their transport to the port or, for the early season fruit sales, the airport. The primary function of canned lychees or lychee

pulp exporters is processing (fruit preparation, canning or sterilization, labelling or freezing) and transport.

As previously mentioned, given that access to financial services is limited, exporters also perform a function of financing collectors. For the majority of certified organic and fair-trade production, pre-financing concerns only the one producer cooperative currently certified. In this framework, there are no collectors, but simply transporters. Finally, exporters have a function of searching for new product markets, although this is not currently well developed.

Investing in a treatment plant constitutes the main entry barrier to the canned and pulp export business. This barrier explains why the vast majority of exporters come from families historically present in the sector and anchored in the production region.

Treatment and transformation stations of fresh and canned lychees operate between 5 and 10 days per year, depending on the export volume and productive capacity of each. The main production factors are capital in the form of station equipment (sulphur chamber, sorting chains, loading and unloading areas, transformation chain for canned lychees), work (organized in teams of 300 to 400 workers), sulphur and cardboard packaging for fresh lychees (cans for canned lychees). Access to these factors pose different challenges for exporters. Investment in a station, as named above, is often based on existing family and historical capital. Access to work does not appear to be problematic although the stabilization of teams from one year to the next is not always possible. Sulphur powder is imported, but it is easy to access and inexpensive. Of the cardboard used, 50 per cent is made in Madagascar and the rest is imported from South Africa.

The transformation function requires a large investment in equipment. The equipment is imported (canning, sterilization, freezing). The high level of investment required and the lack of access to financing facilities constitute major barriers to entry and partly explains the limited number of players. The economic model works, however, because of a diversification of activity. Using the equipment to transform other products over the year makes amortization of investments possible on an annual basis and not only for seasonal activity.

103 With the following assumptions: average tonnage per vehicle of 1.5 tonnes, on average 1.5 worker per vehicle.

The size of treatment and processing plants vary, as does the internal organization, but are close enough to estimate the volume of employment at this stage of the supply chain. It is estimated that about 25,000 people work in treatment and processing stations during the lychee season, which spans 5 to 10 days for fresh and 10 to 15 days for processed lychees. Employment is seasonal and, with the exception of companies that have several other activities and mobilize their permanent workers, work is temporary.

During the export period, most treatment stations operate both day and night with teams of 200 to 300 workers (representing an average of 500 workers per treatment station, with a total of 25 treatment stations in the region of Toamasina, one canning station and two pulp processing stations). All but one of the treatment stations are Global GAP certified, and the canning station as well as one of the pulp processing stations are Fair Trade and Organic chain of custody certified, which means they are regularly audited. The certification module includes compliance with legal obligations in the area of national labour law. As a result, in theory,¹⁰⁴ station workers are formalized, have employment contracts, receive payment for overtime and are affiliated to social security (CNAPS and OMSI) for the duration of their contract. Wages vary little from one company to another, but the total remuneration is on average twice the minimum wage. This does not necessarily mean that the hourly rate is higher than the minimum wage. In many cases, minimum wage is related to the number of hours worked (12-hour shifts) and night work.

Importers

For historical reasons, two importers from Madagascar dominate the market for fresh lychee in the European Union.¹⁰⁵ Greenyard (formerly Univeg / Katope) and Compagnie Fruitière are currently the two importers of sulphur-treated lychees to the EU and Switzerland. These two players won a public tender in 2011 launched by the GEL following a period of open competition between importers. This influenced an instability of the sale price in Europe and did not promote a healthy structuring of the sector. The two sell

lychees to wholesalers and supermarkets. The market is mainly France (between 35 and 40 per cent), Germany, Austria and Switzerland (between 40 and 45 per cent) and to a lesser extent (about 5 per cent), England.

The role of those two importers in the configuration of the supply chain is extensive and they are the main actors on which the financing, logistics and efforts to professionalize the supply chain (crop monitoring services, laboratory, logistics and certification) are based. To this end, the two importers pool their resources and compete only once the lychees have arrived on European soil where each has its own marketing strategy towards its customers (wholesalers, retailers) and negotiates prices.

The sale of fresh lychees for the holiday season is the cornerstone of the importers' marketing strategy. The festive period allows the sale of exotic fruits, whose price to the consumer is comparatively higher than that of European seasonal fruit. This explains why importers have had a real interest and the financial capacity to mobilize investments in their supply chain.

Other importers are:

- Importers of fresh lychees based in the United Arab Emirates, Russia, Mayotte and European-based early season fruit importers, representing just over 2,000 tonnes of fresh lychees. The market for fresh lychee diversified in recent years, with new destinations such as the United Arab Emirates and Russia. For these destinations, the exporters concerned were able to forge direct relationships with importers in those countries.
- Importers of lychee pulp based in South Africa (between 600 and 1,000 tonnes each year of uncertified pulp) and in the European Union (200 tonnes certified organic and fair trade, a single importer of "ethical" products).
- Importers of certified organic and fair-trade lychees (only one importer of "ethical" products) or only fair trade certified (one importer - Swiss retailer), with a total volume of nearly 250,000 cans in 2016 (representing less than 200 tonnes of fresh lychees).

104 And according to actors interviewed during the study.

105 The first exports by conventional boats from the port of Toamasina began in 1996 and mobilized a dozen competing European importers sharing the spaces available in the mobilized boats (between 4 and 6). Competition between the different importers during the commercial phase did not guarantee good economic results and in 2011, the two biggest players decided to unite to control the transport and marketing of lychees transported by boat to Europe.

Retailers

Buyers are mainly major retailers and to a lesser extent, wholesalers and smaller businesses specialized in fresh products in the French, German, Austrian, Belgian, Swiss, and English and, in smaller quantities, Russian and Emirate markets.

Large-scale retailers make up the biggest part of the market. Major European groups play an important role in the value chain in Madagascar (in particular demand in large quantities, increase in certified demand, etc.). Buyers in the European Union are pushing the market for certified lychees and the importers of lychees have invested in the sector to meet this demand, which is driven by large German, Austrian and Swiss retailers. The objective of the two

main importers is to move to a 100 per cent certified Global GAP production by 2019. In addition, both importers are also marketing fresh fair trade lychees, the volume of which tripled between 2015 and 2016.

Specific data on lychee purchase and sales by distributor is not available in the public domain, however, the main function of supermarkets, is, of course, product distribution to the consumer. To the extent that supermarkets are particularly concentrated in Europe, as shown in the table below, they also benefit from significant bargaining power. Buying prices for fresh lychees once in Europe typically follow a variation with high prices at the beginning (before Christmas) of the season and then lower prices as time passes, due to the perishable nature of the fruit.

Figure 21. Main European retailers

Group	Origin	International Rank 2015	Countries where the retailer is present	Revenue 2015 (M US\$)
Schwarz Unternehmens Treuhand KG	Germany	4	26	94,448
Carrefour	France	7	35	84,856
Aldi	Germany	8	17	82,164
Tesco	United Kingdom	9	10	81,019
Metro Ag	Germany	13	31	68,066
Auchan	France	16	14	59,050
Edeka Group	Germany	18	1	52,477
Casino Guichard-Perrachon SA	France	19	31	51,257
Rewe Combine	Germany	22	11	43,607
Ahold Delhaize	Holland	23	6	42,435
E. Leclerc	France	26	7	39,277
Sainsbury	United Kingdom	28	1	35,100
Intermarché	France	32	4	30,857
Morrison Supermarket PLC	United Kingdom	40	1	24,551
Migros-Genossenschafts Bund	Switzerland	41	3	24,391
Coop Group	Switzerland	45	6	22,449
Mercadona	Spain	48	1	21,171
Système U	France	49	4	20,694

Source: Deloitte. 2016.

As far as the distribution of canned lychees from Madagascar in Europe is concerned, a Swiss retailer has been involved in the supply chain since 2012. The retailer sells canned lychees as its own brand. They are shipped in containers. Originally, the distributor sought to develop his line of exotic, canned fruits and made contact with the only certified production cooperative in the Toamasina region. Then, the retailer looked for a transforming company on the spot. This research corresponded, according to the importer, both to the personality of the buyer then in charge of this portfolio and to the cooperative values of the group, rather than to a specific market demand on lychee. To the extent that the processing company already existed and exported green pepper and canned snails, an agreement was reached to begin exporting canned lychee to Switzerland. In this case, the importer is also the distributor and the product is fully processed in Madagascar. Imports have grown steadily since 2012. In 2012, one container was imported, compared to five containers shipped in 2016. The distributor now imports about 75 per cent of the canned lychee produced in Toamasina.

Institutional environment of the value chain in Madagascar

The institutional environment of the value chain in Madagascar is composed of different authorities, in particular:

- Local authorities are in charge of the issue of road patents and vehicle inspections.
- The Ministry of Commerce is in charge of issuing annual, export authorizations. The authorization is extended to each exporter following approval of their fruit processing and packaging unit.
- The Ministry of Agriculture is responsible for issuing phytosanitary certificates and derogations for the export of "early" products (lychees exported before the official date fixed for fruit collection).
- The Ministries of Trade and Agriculture participate in regional meetings organized to determine the start date of the lychee collection in the Atsinanana and Analanjirofo regions.
- The Ministry of Labour and its decentralized services have a mandate for workplace compliance checks.
- The social security bodies and the Ministry of Health provide in cash and in kind benefits to populations.

Occupational Safety and Health vulnerabilities in the lychee value chain from Madagascar



Vulnerability profile

Smallholders and temporary agricultural workers

Associated main OSH risks

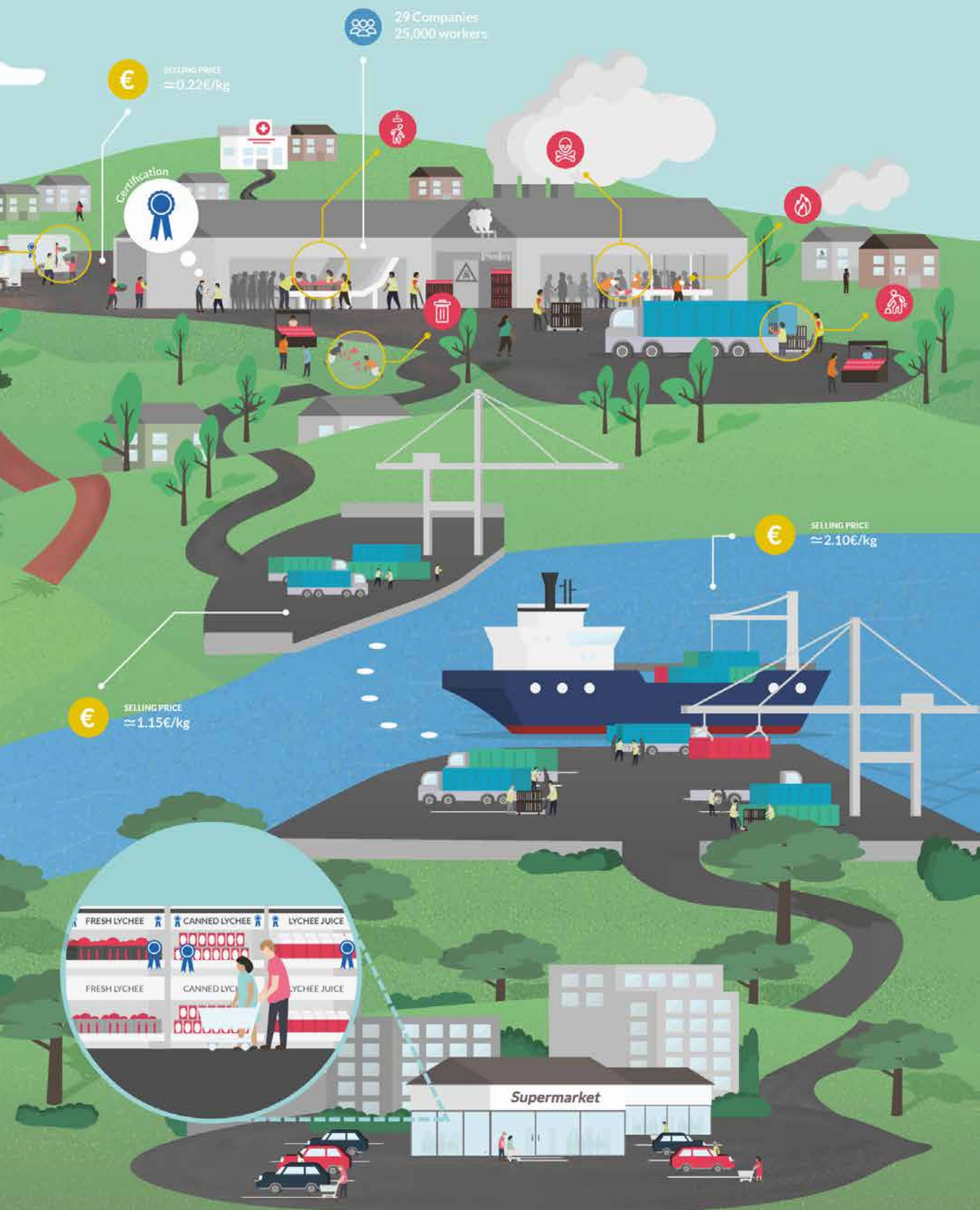
- Fall from heights
- Heat exposure
- Unsanitary water
- Heavy lifting
- Road safety
- Pest exposure
- Fall of object

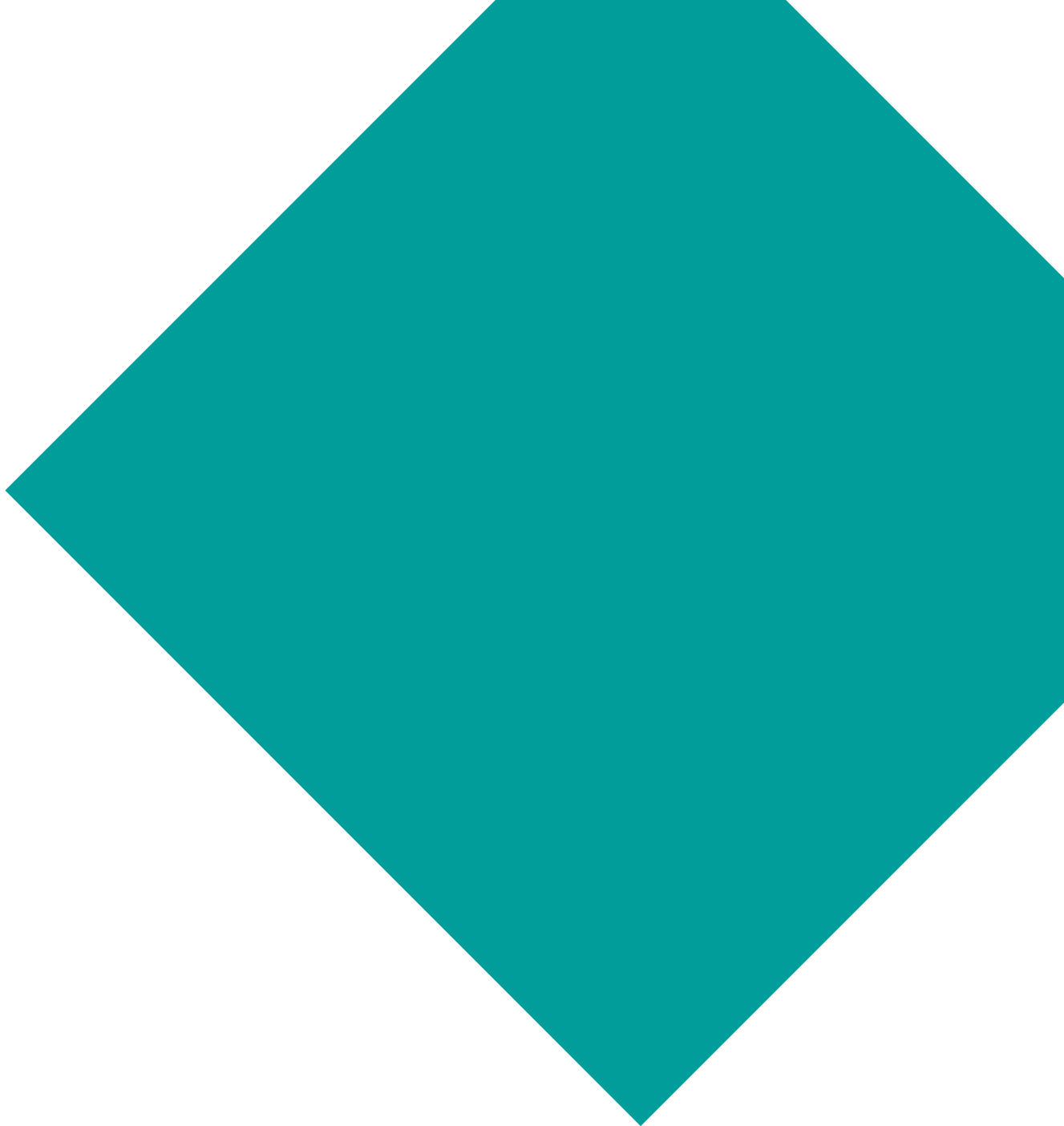
Temporary treatment and transformation station workers

- Sulphur exposure
- Fire
- Heavy lifting
- Fall of object

Surrounding communities

- Waste management







2 | Drivers and constraints for OSH improvement

It is necessary to emphasize the uniqueness of the lychee supply chain in Madagascar and its success. Indeed, the country's products are generally poorly integrated into global supply chains, notably because of the Madagascar's difficulties in overcoming non-tariff barriers for its products. The lychee sector is an exception as it succeeded in penetrating the market for fresh products and its sanitary regulations in Europe. As mentioned above, this was accompanied by some improvements in the management of occupational safety and health as well as in employment conditions. Hence, there is the potential to use global supply chains as leverage to improve safety and health in the country.

In theory, it would therefore be appropriate to explore both the possibilities for OSH improvement in the lychee supply chain, and the possibility to replicate the experience elsewhere. This could be accomplished with the rest of the lychee production from Madagascar, which exports only a fourth of its production. Other agricultural supply chains, especially spices and fruits and vegetables, could be included, as could the national OSH system as a whole.

Policy and development support to agro-food functional upgrading

Policies and financing for cooperation in rural development and the modernization of agri-food production processes are at the origin of some important factors that facilitated both the competitiveness of the sector on the international market and the elimination of certain occupational risks. Indeed, two programs of financial support played an important role:

- Until 2008, support activities in the lychee sector were carried out within the framework of the 10th European Development Fund of the EU and IFAD, focusing on upstream processes (mainly replanting, structuring of producers, Global GAP and Fair Trade certifications).
- From 2010 to 2014, financial support was provided to exporters under the EU PIP program,¹⁰⁶ concentrating actions on sulphur control (GSAC) and support towards compliance to Global GAP certification and its GRASP¹⁰⁷ module. This latter program was largely responsible for functional improvements at the treatment stations.

This support to functional upgrading had a positive impact on labour productivity¹⁰⁸ as well as reduction and elimination of certain occupational hazards at treatment plant level, in particular:

- i) Reduction of sulphur exposure for treatment plant workers. The EU's PIP program enabled the financing of gas neutralization systems (for the gas released after sulphur combustion in treatment stations). All stakeholders identified this as a key factor in improving safety and health conditions in treatment stations over the last decade. Previously, sulphur chambers were degassed by simply opening the doors onto the reception and sorting lines.
- ii) Streamlining production processes and development of good OSH practices in certain workplaces. Support given to the sector and modernization of equipment in treatment plants allowed for the reorganization of workplaces towards more streamlined production processes. In this context, certain workplaces adopted processes that

are better suited to prevent occupational risks, in particular, ergonomic ones. For example, some treatment stations have set up ramps to unload lychee delivery trucks. Ramps allow for the flow of products on the sorting lines and limit the transportation of heavy loads. In some stations, lychees are sorted upon arrival, which also limits the volume transported, treated with sulphur, and subsequently sorted, thereby further reducing the sorters' exposure to sulphur.

The multiplication of the impact on OSH that this funding could have had was limited by the following factors:

- i) The weakness of systems for assessing productivity gains related to the improvement of working conditions, and in particular on OSH. The business case for good OSH practices and relative productivity gains remain somewhat vague to exporters.
- ii) Access to finance remains a bottleneck for investment in technological and functional upgrades that have positive effects on working conditions throughout the supply chain in Madagascar. In terms of investment, access to bank loans is not easy, which limits new entrants among exporters (i.e. significant investment required in terms of land purchase, construction of processing or transformation plant, purchase of processing or treatment equipment). Recently, private investors, notably pension funds from Mauritius, supported the development of export structures. In this context, part of the capital of the company becomes the property of the pension fund (in proportion to the investment granted). The exporter becomes associated and in charge of the management of the company. At present, three companies used this form of investment to develop their production capacity and upgrading. Where there has been funding through the above programs, they had no effect on upgrading of production processes at the producer level. Access to credit and savings services for producers is also limited. According to the Direction Générale du Trésor, there were fewer than 1,000 points of service in 2015.

106 PIP: *Programme Initiative Pesticides* (Pesticide Initiative Programme) implemented by the Europe-Africa-Caribbean-Pacific Liaison committee (COLEACP).

107 GLOBALG.A.P. Risk Assessment on Social Practice.

108 Although there is no rigorous measure of productivity, the players in the chain agree that the rationalization of production processes and their modernization reduced the time of the season for the same production volume.

The microfinance sector is growing in Madagascar, but access is still inadequate, particularly in rural areas. To the worries of geographical access are added difficulties in fulfilling the conditions of access to credit.

- iii) Minimal sharing of good practices on production, productivity and OSH practices. Thus, production processes that reduced risks in certain workplaces are not necessarily shared or generalized to other worksites.
- iv) Access to professional consulting services that provide technological solutions to improve OSH and productivity is very limited. This type of service does not seem to exist in the supply chain in Madagascar. In addition, exporters underline difficulties in recruiting and retaining qualified supervisory staff from one year to the next. The remoteness from the capital city and the short duration of the season seem to limit the attractiveness of the sector.

Supply chain risk management

Given various health crises in Europe, significant consumer pressure emerged and led decision-makers to introduce stricter regulations on food products entering the EU market. Furthermore, in order to provide consumers with additional security assurance, numerous commercial certifications were introduced and progressively applied to products from developing countries (Global GAP - initially EurepGap and standards like IFS, BRC, ISO 9001, etc.).

Lychee from Madagascar followed this trend, as virtually all the products marketed are sulphur-treated before export and sulphur residue in the pulp is subject to a Maximum Residue Limit (MRL) to enter European markets (10 mg per kg of SO₂ in the pulp). Over the past five years, compliance with this MRL has been the main regulatory constraint importers encounter and that buyers (mainly large retailers) control before purchase.

In order to manage the financial risk associated with compliance with this MRL, large retailers that buy fresh lychees gradually imposed the implementation of a pri-

vate compliance initiative, known as the Global GAP certification. Failure to comply with the MRL has significant financial implications for importers, who see their goods rejected entry to the EU, and distributors, who are unable to source lychees. In 2010, excessive sulphur residues led to the closure of the German, Austrian and Swiss markets. Thus, retailers sought to minimize this health and financial risk by imposing a certification to their lychee supply chain in Madagascar.

In 2006, COLEACP's Pesticides Initiative Program (PIP no. 1) launched a program to support the sector and enable operators to meet the quality control requirements of their buyers. It was a voluntary program and led to the first exporter to undergo certification audit in December 2006. In parallel, local experts (from the *Centre Technique Horticole de Tamatave*) were also trained to implement quality assurance processes. The training was consistent with the requirements of the reference system (EurepGAP at that time) to support exporters wanting to comply with these new requirements.

After good agricultural practices, hygiene and food safety became flagship themes. In 2014, the first exporter of fresh lychee was certified according to IFS requirements (IFS Food version 6), as well as an exporter of processed fruit (it was IFS certified since 2011 but on different canned products). New emerging topics concern environmental protection, social practices and the safety of worksites. By 2015, some operators in the lychee supply chain began to meet the requirements of GRASP, a complementary module of Global GAP on compliance with working conditions. Under the pressure of consumers and buyers, in 2016, exporters were strongly encouraged to introduce the application of this module within their quality systems.

GRASP certification is not related to a particular product positioning and is not associated with a premium price for lychee sale. This is a condition of market access for a number of retailers. In particular, supermarkets in the German-speaking countries of Europe increasingly view it as a necessary element in their purchasing decision criteria.

The volume of products meeting these certifications increases every year and require exporters to adapt to the requirements of the standards.

Figure 22. Selected data on sulphur-treated lychee exports with Global GAP certification

	2013-2014	2014-2015	2015-2016	2016-2017
No. Of exporters certified with Global GAP (over a total of 30 in 2016-2017)	26	26	26	29
No. Of producers certified with Global GAP	325	322	362	817
Certified surface (hectares)	366,1	592,3	935,2	3961,1
Average surface per producer (hectares)	1,1	1,8	2,6	4,8
GRASP : induction initiated (over 30 exporters)	-	-	-	21
No. of exporters with at least 75% of their sales certified with Global GAP	-	-	-	9

Source: authors based on collected information.

Under pressure from buyers, in the 2016-2017 season, all but one exporter became certified as Global GAP. The GRASP module is also increasingly taken into account (21 out of 29 Global GAP certified exporters), although, in the same 2016-2017 season, only four fully met GRASP requirements. Global GAP certification measures the degree of compliance of the management system and agricultural practices, with a strong emphasis on food safety standards. Obtaining the certificate requires the establishment of a quality management system and traceability of the production chain from the outset. Compliance points are more extensive and distinct for processors, treatment stations, and packers than for small producers. Maintaining the certificate is subject to an annual, external audit for exporters, while producers are grouped and a sample corresponding to the square root of their number is audited randomly each year. In recent years, auditors noted an increase in compliance due to pressure from buyers, but also noted a better understanding of compliance points by processing and treatment stations. Nevertheless, conformity is more difficult to obtain with producers, particularly in regards to documentation of activities and the formalization of work.

Nine exporters now have more than 75 per cent of their production certified Global GAP, of which three have 100 per cent, representing a total of 546 hectares for the last export season. These nine exporters therefore accounted for 55.8 per cent of all producers engaged in certification, but only 13.8 per cent of certified areas. These exporters probably favoured and included in their networks producers who owned the parcels with the highest concentration of lychee

trees. The goal of importers is to move towards a 100 per cent certified Global GAP production by 2018-2019, which implies a reorganization of the supply chain for the remaining exporters during upcoming seasons. In practice, it is difficult for exporters to be partially certified. Indeed, this requires that products from certified parcels be identified and kept separate from others during all stages of production, transport, weighing, sulphur treatment, sorting and packaging. In processing and treatment stations with limited space and with significant time constraints linked to the short duration of the season, this separation is not easy, which pushes exporters to move forward in the Global GAP certification process.

The cost of the Global GAP certification (cost of audits and implementation support services) is financed by importers, which has been a key incentive to almost all exporters and an increasing part of their supply base (producers, transporters). The main impacts of this process on occupational safety and health in the supply chain are:

- i) Adoption of formal OSH management systems at processing and treatment stations. Stations have documented and implemented OSH risk management systems. This process of documentation, signage in the workplace and wearing personal protective equipment for the identified risks is directly related to the certification process.
- ii) Generalization of the formalization of work in treatment and processing stations, together with social security coverage during the contract period. As part of the certification process, documentation of the company's overall management

system requires proof of compliance with labour laws in force in the country. Most of this evidence is documentary and consists of the employment contract and the payment of social contributions. The systematization of verification (audit) in certified stations contributes to an effective formalization of the work and the protection that goes with it (health coverage, including occupational health and occupational health services and employment injury insurance).

- iii) New traceability from the exporter to the producer with two main consequences: (i) the professionalization of transporters (instead of collectors) with a certain degree of formalization and a fixed payment that does not encourage risk taking at work. This is contrary to volume-based payment under the prevailing system of collectors; (ii) the establishment of visible producer groups that have direct interaction with exporters. Direct contact enables awareness of good agricultural practices. Interactions occur through physical meetings before and during the season when basic questions are addressed, such as access to water, basic tree maintenance, and food handling. The Lychee Exporters' Group (GEL), in the framework of Corporate Social Responsibility, has been able to finance basic infrastructure to access water in certain places. Meeting the requirements of the Global GAP often requires investments at the level of production that the producers themselves are not always able to make.

These impacts, as illustrated above, are not always direct and may be limited by the following factors:

- i) At the level of processing and treatment stations, certification is widespread, and therefore affects OSH. However, those who are not certified do not seem to benefit from these impacts (one non-certified station, as well as non-certified producers, collectors and the ones operating for the local market).
- ii) The weakness of OSH risk management support services. Access to professionalized support (expertise, training, etc.) in the identification and assessment of risks at treatment and processing stations (and in Madagascar in general) is limited. In addition, the emphasis is most often on very high and visible risks (such as fire safety) and on the provision and wearing of personal protective equipment (PPE) rather than risk elimination or reduction. This is especially true with

risks that have the least visible, immediate effects (ergonomic risk factors, low prolonged chemical exposure, etc.). To the extent that the certification process focuses on the existence of a risk management system, its documentation and its visible application, does not necessarily make the content or how it was formulated, easy to evaluate (i.e. participation of workers, respect of the hierarchy of controls to eliminate and control risks, etc.). Taking this step further would require appropriate support services greater than just compliance checks.

- iii) The allocation of value in the supply chain does not always make investments in technological upgrading possible, which are necessary for the elimination or reduction of risk factors in the supply chain, in particular at the level of small producers. Indeed, the certification process can lead to gradual awareness on occupational risks and the need to address them (but also the need to formalize labour relations). However, this is not accompanied by a financial incentive to invest in the basic equipment and infrastructure necessary for the elimination or reduction of certain risks (in particular the risk of falling and the risks associated with basic health infrastructures at the producer level).
- iv) The lack of clarity in the legal framework for the protection of family and unpaid workers also limits the impact of certification on improving employment conditions in general and OSH in particular. In the case of the lychee supply chain, most workers fall under the definition of seasonal work under the Labour Code (Article 52) with the exception of producers and their unpaid family workers. For the supply chain, the risk of employing children under 15 years of age (minimum age for employment) and minors over 15 years of age can be easily controlled at certified treatment and processing stations (annual audit, and given the short duration of the season, control is systematic). Conversely, there is a risk at the level of small producers in view of the current social norm in a farming environment where all family members who are physically able to do so are expected to contribute to farm activities. The Malagasy legal framework does not openly address the issue of child labour in the context of unpaid family activities. However, we can give elements of understanding on the dynamics observed in the supply chain at the level of production. The very short

duration of the season does not suggest any major incompatibility with schooling and, if so, adjustments could be made relatively easily. Rather, the issue is with the definition of the activities carried out, the nature of certain activities at the harvesting stage (or rather the way it is practiced without equipment and tools) and the transport of heavy loads hazardous for health and safety, especially for children and young workers. The fact that the legal and institutional framework offers little clarity on the work of minors for unpaid family activities as well as the prevailing social norm in rural areas could play a role in the future evolution of the sector, in particular with the increase of the certification process. In many developing countries, pressure from international buyers to control risks in their supply chain related to their own image resulted in a certification becoming a market access requirement. In some cases where the regulatory framework for hazardous work was not sufficiently clear, understood and adapted to all sectors, the above-mentioned process may have resulted in the inability of some small producers to comply, thereby excluding them from the export market. One of the future challenges for the competitiveness of the lychee industry may be linked to this issue.

- v) Finally, the seasonality of the activity hinders rapid implementation of corrective actions when auditors identify non-conformity. The supply chain tends to evolve from one year to the next. The quick duration of the season does not often allow for the identification and implementation of corrective actions in the same season.

New markets

New, high growth, markets for ethical and organic products have emerged in Europe and North America. In 2012, sales of ethical products worldwide were almost six billion euros, six times more than in 2013.¹⁰⁹ The sector remains dynamic despite the economic crisis and food products constitute over 90 per cent of sales. The European Union is the world's largest market for these products, accounting for two-thirds of sales in 2012 (European Commission, 2011 and 2012 a, b, and c).¹¹⁰ Similarly, the market for organically grown products has grown steadily over the last ten years. The total value of the EU organic retail market has doubled from 11.1 billion euros in 2005 to 24 billion in 2014.¹¹¹

The distribution of these products evolved from specialized shops to a widespread distribution in supermarkets. This development was accompanied by the emergence of organic and fair-trade products in retailers' own brands (i.e. marketed under the own brand of supermarkets). This phenomenon affects the market for fresh products, especially exotic fresh fruits (bananas, mangos, lychees, etc.), which stimulates fruit importers' demand for organic and fair trade certified products.

Since 2006, several commercial constraints arose for lychee from Madagascar in relation to new consumer expectations as well as subsequent importers' demands (especially regarding ethics at work, workers' health and safety, product traceability, producer remuneration, etc.). This situation imposed the implementation of various certifications. Some correspond to a concern for risk management in the supply chain

109 La Plate-Forme pour Commerce Équitable

110 European Parliament.2015.

111 IFOAM-EU Group. 2016.

from retailers, as is the case for the Global GAP certification and its GRASP module mentioned above, while others respond to product positioning such as fair trade and organic farming certifications.

During the 2016-2017 campaign, five operators exported fresh, sulphur-treated fruit certified fair trade. The whole of canned exported lychees is also certified fair trade with part coming from organic farms. The market for this certification in Europe is growing every year, especially among retailers from German and English speaking countries. At the procedural level, these certificates are granted and maintained in the same way as the Global GAP.

Although farmers do not use agro-chemical inputs, organic certification is limited and auditors encounter significant compliance challenges faced by producers. These are mainly related to: (i) the difficulty of assimilating and maintaining the documentation required for the certification granting and compliance monitoring processes; (ii) the presence of chemical agents in the household (especially impregnated bed nets) where agricultural products are also stored; and (iii) the presence of carbon residues from slash-and-burn practices in the direct environment of farms. Furthermore, the organic market concerns only processed products (pulp, canned). Early harvest, sulphur-treated lychee is ineligible.

The main impacts on occupational safety and health are as follows:

- i) Adoption of formal OSH management systems at processing and treatment stations, following the same process as the Global GAP certification.
- ii) Generalization of the formalization of work in treatment and processing stations, together with social security coverage for the length of the contract, in the same way as for Global GAP certification.
- iii) Adoption of good agricultural practices at the level of certified producers (access to water, tree maintenance, basic training in food handling). Certified organic and fair trade producers are grouped in a cooperative with more than 500 producers, 90 per cent of whom produce lychee. Access to information and awareness-raising services is facilitated by: (i) the fact that organic and equitable certifications require the adoption of good basic

agricultural practices as key compliance points; (ii) that the cooperative is professionalized and has resources to invest collectively for the benefit of producers. Part of this investment concerns the working conditions of producers and their awareness of good agricultural practices. Via the functioning of fair trade, a premium price is paid for certified products shared between the producer and the cooperative. For this organic and fair-trade sector, there is a unique cooperative whose success is largely linked to its ability to market several export products (mainly fruits and spices).

- iv) Awareness of chemical and biological hazards within certified producers. Organic certification involves the strict adoption of production practices that by themselves eliminate chemical risk. This certification details the production processes and inputs used. It therefore requires producers be made aware of the identification of compliance points that are linked to environmental risks (underlying organic farming). In fact, these good environmental practices are concomitant with the elimination of certain occupational risks for producers and agricultural workers, in particular chemical and biological risks. Again, the collective organization of producers in a cooperative facilitate the awareness-raising process.

These impacts, as illustrated above, are not always direct and may be limited by the following factors:

- i) As for the Global GAP certification, the players in the supply chain who are not certified do not benefit from the impacts in working conditions and OSH. The cooperative organization marketing several types of products certified for export makes it possible to mitigate this limitation by ensuring that all member producers are monitored throughout the year.
- ii) Although the growth of this market is high, it remains small compared to the non-certified market, which in effect limits the number of eligible producers. Prospects for growth in demand in Europe are good, however, in this niche Madagascar is competing with Asian countries (especially for processed products such as juices and canned fruit) which have lower production costs (processing and packaging materials available lo-

cally at a low cost and economies of scale with large volumes and a dynamic regional and local market).

- iii) Although the cooperative is active throughout the year, some of the limitations created by the seasonality of the activity outlined above apply here as well, and so does the lack of clarity in the legal framework for the protection of unpaid family workers.

Existence of prevention, protection and compensation policy frameworks

Global market access and integration into a global supply chain led to modernization of production processes and, with it, two trends with opposite effects on OSH:

The emergence of new risks. Specifically, these risks relate to two main factors: (i) chemical exposure to sulphur in the processing of fresh fruit; and (ii) the new time constraints imposed by the export of fresh produce, which result in the need to work quickly.

Other issues, such as night work, sometimes in difficult climatic conditions for transporters, in particular, may exacerbate risks (i.e. road safety, etc.).

At the same time, the creation of formal jobs at the level of exporters (processing and treating plants) increased to meet the protection requirements of the Labour Code and the Social Security legislation.

This dual phenomenon resulted in both greater demand for prevention, protection and compensation services set up by the State, but also an increase in their effective use by previously uncovered populations. This was possible because policies and services in these areas existed, demonstrating that global market integration can be accompanied by improved working conditions, even in the least affluent of countries, when enabling policies and institutions exist.

Madagascar ratified 42 ILO Conventions and one protocol (of which 36 are in force), the following ILO instruments that relate to Occupational Safety and Health.

Convention	Date	Status
C081 - Labour Inspection Convention, 1947 (No. 81)	21 Dec 1971	In Force
C129 - Labour Inspection (Agriculture) Convention, 1969 (No. 129)	21 Dec 1971	In Force
C182 - Worst Forms of Child Labour Convention, 1999 (No. 182)	04 Oct 2001	In Force
C013 - White Lead (Painting) Convention, 1921 (No. 13)	01 Nov 1960	In Force
C004 - Night Work (Women) Convention, 1919 (No. 4)	01 Nov 1960	In Force
C012 - Workmen's Compensation (Agriculture) Convention, 1921 (No. 12)	10 Aug 1962	In Force
C006 - Night Work of Young Persons (Industry) Convention, 1919 (No. 6)	01 Nov 1960	In Force
C014 - Weekly Rest (Industry) Convention, 1921 (No. 14)	01 Nov 1960	In Force
C019 - Equality of Treatment (Accident Compensation) Convention, 1925 (No. 19)	10 Aug 1962	In Force
C089 - Night Work (Women) Convention (Revised), 1948 (No. 89)	10 Nov 2008	In Force
P089 - Protocol of 1990 to the Night Work (Women) Convention (Revised), 1948 ratified on 10 Nov 2008 (In Force) Has ratified the Protocol of 1990		
C118 - Equality of Treatment (Social Security) Convention, 1962 (No. 118) Has accepted Branches (b) to (d) and (g)	22 Jun 1964	In Force
C119 - Guarding of Machinery Convention, 1963 (No. 119)	01 Jun 1964	In Force
C120 - Hygiene (Commerce and Offices) Convention, 1964 (No. 120)	21 Nov 1966	In Force
C124 - Medical Examination of Young Persons (Underground Work) Convention, 1965 (No. 124)	23 Oct 1967	In Force
C127 - Maximum Weight Convention, 1967 (No. 127)	04 Jan 1971	In Force
C171 - Night Work Convention, 1990 (No. 171)	10 Nov 2008	In Force

Two main institutions provide prevention, protection and compensation services:

i) Occupational health services

As part of the Interdepartmental Health Services governed by the Labour Code, employers are obliged to provide medical services to employees in the formal sector, mainly:

- Medical check-up at hiring stage
- Systematic site visits
- Curative and preventive care
- Consultations, care and medicine

The promotion and prevention of occupational risks is the primary mandate of occupational health services. Occupational health services are organized by *DECRET N ° 2003-1162*. Services are decentralized (there is no equalization at national level or pooling of risk) and funded jointly by employers and workers¹¹² through the Inter-professional Medical and Social Organization (OMSI). Insofar as there is no health insurance scheme in Madagascar, the OMSI also covers the dependents of affiliated workers. In practice, occupational medical services are provided by the Inter-company Medical Services (SMIE) or, exceptionally, by the SMAE (Independent Medical Services run by the company itself). The OMSI therefore manages health centres where both formal contributors and their families access care (preventive, curative and pharmaceutical care). The creation of these centres is based on the volume of affiliates, so none currently exists in rural areas.

In practice, occupational health services provide annual medical examination to the various formal companies in the lychee supply chain (mainly exporters), with logistical problems sometimes linked to the very short duration of the season and OMSI's lack of internal capacities. For many seasonal workers this preventive contact with a health professional is often their only contact during the year. Access to care, in the OMSI's facilities, beyond the employment contract period is not possible. Private care exists, but is often outside the reach (financial, geographical etc.) of many workers.

ii) The National Social Welfare Fund (CNAPS)

CNAPS is a centralized institution with a tripartite governance structure that manages the three social security schemes set up by the Social Security Code,¹¹³ namely the family allowance scheme, the retirement pension scheme and the employment injury and diseases scheme. The latter includes provisions for prevention in three main areas: (i) the collection and analysis, in collaboration with the labour inspectorate, of data on occupational accidents and diseases during inspections; (ii) financing of preventive actions carried out by the member companies through a specific fund; (iii) the obligation to visually indicate (signage) risks and preventive measures at each affiliate's workplace.¹¹⁴

Benefits provided by CNAPS include:

- Benefits granted in the context of occupational accidents or diseases (medical expenses and annuities)
- Reimbursement of medical expenses for childbirth
- Half-pay compensation for women during maternity leave
- The implementation of health and social actions
- Old age pensions

CNAPS is responsible for the administration of the compensation scheme in case of occupational accident or disease. The effective coverage is mainly focused on formal sector enterprises in urban areas. The benefits covered by the scheme include: (i) temporary disability through income replacement, financing of related healthcare costs, and rehabilitation; (ii) permanent disability, through a periodic pension; (iii) death, with a periodic pension for survivors.

The impacts described above are limited by the following factors:

- i) The gap or discontinuity of protection linked to the seasonality of the activity. Workers at lychee treatment plants are affiliated to CNAPS and in some workplaces OMSI for the duration of their contract. Given the short duration of the contract,

112 Contribution rates: employer: 5%, worker: 1%.

113 Décret n° 69-145 du 8 avril 1969 fixant le Code de Prévoyance sociale.

114 www.cnaps.mg

however, this does not allow on-going access to social protection throughout the year. Moreover, this creates a heavy administrative process of affiliation and disaffiliation each year at the time of the exporting season, which lasts two weeks.

- ii) Limited availability and effectiveness of prevention, protection and compensation services. The services in question, especially occupational health services, are not always equipped to cope with a seasonal influx like that of the lychee season. In addition, staff are not necessarily trained to detect and respond to health problems related to exposure to specific (and relatively new) occupational risks in the supply chain.
- iii) Lack of integration and coordination as well as existing funding mechanisms for prevention, protection and compensation services. With regard to access to occupational health services and health care in general, the system is divided between OMSI, financed by compulsory contributions from workers and employers in the formal sector, and the Ministry of Health, which is supposed to take care of any person needing care. This situation creates a discontinuity of health contact points for workers at treatment and processing stations that are active only a small part of the year. In addition, OMSI funding is decentralized and there is no equalization at the national level, resulting in unequal distribution of health structures between regions and their absence from rural areas. Finally, there is no coordination or integration with the compensation mechanisms managed by CNAPS, although it is indicated in the Code of Social Security that CNAPS must participate in the prevention effort.
- iv) Coordination among actors responsible for compliance, prevention, promotion, protection and compensation functions is provided for in national regulatory provisions (policy formulation). In the field, the actors are few and have limited resources, causing limited effective service delivery. This is accompanied by limited coordination and cooperation.
- v) Coordination and collaboration with local authorities or decentralized services not directly responsible for the promotion of health and safety at work does not appear to exist. Insofar as services and presence on the ground are limited, the actors do not necessarily feel the need to engage

in coordinated strategies and concerted action at the sector level.

- vi) The limited scope of existing policies. The services mentioned above apply to certain categories of workers defined by the Labour Code and, in fact, exclude informal work. While formalized workers in lychee treatment and processing plants can benefit from preventive care and social protection during their contract period, the same is not true for producers and their agricultural and family workers.

The opportunity for a strategy to improve working conditions and competitiveness at the level of government services

At the government level, there is no current, concerted strategy linking compliance and competitiveness, or that, which is capable of articulating prevention, promotion and enforcement in an effective and balanced way throughout the whole supply chain. That is to say, a vision involving coordination of the various government departments responsible for support and compliance functions (in particular, the Ministry of Commerce, the Ministry of Agriculture, the Ministry of Labour and the Ministry of Health) articulating decent working conditions as a competitive advantage on the global market. This strategic vision is necessary to support a clear approach with the actors of the sector and to be able to replicate those experiences that have the most impact and success. The coherence and coordination of policies around working conditions in global supply chains in the country are limited.

Competitiveness issues related to respect for and promotion of decent work are slowly emerging, mainly due to pressure from European and American trading partners. It does not seem that this issue is at the heart of the relationship between the Ministry of Commerce and the exporters yet. The Ministry of Commerce appears to be progressively gaining awareness of the commercial impact of developing decent working conditions. However, there also appears to be a lack of internal capacity and coordination with other ministries on this topic, in particular with the Ministry of Labour. The latter has a labour inspectorate in charge of compliance. Nevertheless, the physical and monetary resources of these services, as well as their concentration in urban areas

and in particular the capital city, do not enable them to fulfil their functions of compliance control and advisory services on occupational risks in a proactive, effective and transparent manner.

The issues of working conditions in relation to competitiveness are not necessarily apparent or addressed by the players in the lychee supply chain, who, at this time, remain largely unorganized. The GEL is the main professional organization of the sector, representing exporters. On the workers' side, the existing trade unions in Madagascar are not present in the supply chain. As far as producers are concerned, they are also poorly organized, with the exception of a few cooperatives. Finally, as of 2014, GEL is no longer an active member of the GEPAT (Regional Employers Organization of Toamasina, representing employers in social protection institutions, in particular the OMSI).

Although lychee exporters are organized and have an ongoing relationship with the Ministry of Commerce, there does not seem to be a real strategy for expanding the industry based on its increasing compliance with international private standards. The Ministry organizes meetings with exporters once or twice a year and informs them of developments in the commercial framework as well as promotional events in which Madagascar is invited. Malagasy exporters and the GEL, in particular, do not seem to fully benefit from these opportunities to promote their products internationally. The Ministry appears to have difficulties in mobilizing exporters to participate in this type of forum. This poses two important limitations:

- Non-tariff trade barriers to entry in high value-added markets (US, Canada) limit the expansion of the sector and concerted lobbying would be needed to overcome these barriers.
- It does not yet seem that the potential for expansion and replication of the sector is apparent to the various stakeholders (government, economic actors). If perceived as niches, the global supply chains' potential to be leveraged for improving working conditions decreases.

The weak institutionalization of support functions to improve working conditions in the sector

As explained before, although the policy framework and some institutions exist, the reach of government services that are supposed to play a supporting role in improving working conditions, and in particular of safety and health, are limited:

- i) The services of the Ministry of Labour (OMSI, CNAPs) cover only the formal sector.
- ii) The national health system serves the population as a whole in theory. Agricultural producers and workers in rural areas do not benefit from occupational health services. Access to care and occupational health services in general is difficult. According to the WHO, in 2007, there were 0.161 doctors per 1000 inhabitants.¹¹⁵ This is one of the lowest densities in the world and hides a significant disparity between rural and urban areas. The producers and agricultural workers met during the field research did not report using any preventive services. Instead, delaying the consultation of a professional, which is seen as expensive and difficult to access geographically, was more likely. The health sector is mainly financed by the State, external aid and households through user financial participation introduced in November 1998. From 1997 to 2004, the public health budget in relation to the State budget remained stable or between 8 and 10 per cent. This allocation of resources does not guarantee universal access to basic health care, including prevention, (per capita health expenditure was estimated at US\$6 per year in 2004, while cost estimates for a package of essential health care are between 30 and 40 US\$ worldwide).
- iii) Rural extension services under the Ministry of Agriculture, and in general, are very limited in Madagascar. The Ministry of Agriculture focuses on regulation functions given its limited resources. The Department of value chains identifies promising sectors for each region and ensures their follow-up

115 http://www.who.int/gho/health_workforce/physicians_density/en/

with a view to maximizing value added, but this unit does not benefit from decentralized services. The lychee supply chain has potential in three regions. The structures identified at the local level are; chambers of agriculture; Agricultural Services Centres; the Tranoben'ny Tantsaha (TnT). According to the conclusions of the National Consultation for the Promotion of Social Protection for Rural Workers (ILO, 2015), reinforcing the effective presence of these structures and their field of action on the ground is necessary.

The fact that these support functions are weak has forced importers, in order to ensure that their supply chain meets the criteria required by their buyers and the EU's regulatory constraints, to finance and structure ad hoc support functions, in particular:

- i) Financing of the audit and monitoring system (training for self-supervision by the CHTT in particular) of Global GAP certificates.
- ii) Laboratory. Importers annually fund the CHTT for the establishment of a temporary laboratory for the analysis of fruit quality before export. These analyses concern the following parameters: maturity (Brix measurement), size (fruit diameter measurement), regulatory risk (measurement of sulphur content in fruit pulp), and storage risk (measurement of sulphur content in the fruit pericarp). The laboratory is at the port and operates 24 hours a day during the season. This temporary set-up alleviates the absence of a specialized permanent laboratory for the export of fresh products.
- iii) Harvest forecasting. Importers annually fund the CHTT for the follow-up of the lychee yield in the Toamasina region in order to provide information on available volumes and the strength and duration of the harvest period. With this information, importers, in consultation with exporters, set the dates for the presence of refrigerated vessels at the port of Toamasina.

iv) Autonomous port. Importers annually fund a logistics capacity building team at the port, which is responsible for strengthening the loading arrangements for the two refrigerated vessels. It is important to note that transport and loading teams at the port must be made aware of the risks associated with exposure to sulphur, in addition to the safety rules applicable to normal loading activities. The storage of freshly sulphured fruit in confined spaces (storage shed before loading, chilled storage) requires ventilation before any worker enters the site (aeration of storage sheds, aeration at the time of opening of holds before staff entry).

Given that none of these structures is backed by institutional support or institutionalized as such, limits the potential for extending compliance efforts and improving working conditions to the rest of Madagascar's lychee production and its other supply chains. Three fourth of the country's lychee production, for example, is not currently for export. The CHTT is the only semi-institutionalized, somewhat sustainable actor with public and private funds in the region and with the technical capacity to extend to different supply chains. In other countries and supply chains, some institutionalization of the support functions made it possible, in particular, to:

- Share good practices in production and OSH processes;
- Harness commercial expansion and added value in the producing country to invest in better working conditions;
- Encourage common awareness raising needed to implement a cultural change to the perception of occupational risk in rural areas, particularly at the producer level.

3 Opportunities to improve competitiveness and OSH

3.1. Safety and health vulnerability profiles

Field research revealed two key findings:

- Exposure to occupational risks and low demand for prevention are highly correlated with vulnerability of employment.
- A number of related precarious working conditions (contract, remuneration, working hours, access to social protection, etc.) increases exposure to occupational risks and its consequences.

It is necessary to assess occupational safety and health risks in context to apprehend the degree of vulnerability different categories of workers are experiencing, and further understand what drives these vulnerabilities. This case study proposes to explore the following dimensions to assess safety and health vulnerabilities:¹¹⁶

- Exposure: identifies occupational risks by activity and provides and assessment of the severity and probability of occurrence.
- Sensitivity: identifies the employment situation of workers. The specifics characteristics of which are linked to risk exposure and influence its nature and frequency. The following factors are identified and analysed: access to a workplace risk management system; access to personal, collective and social protections that help prevent occupational risks; status in employment if linked to differential

¹¹⁶ This framework takes stock of various risk assessment methodologies, from both an OSH perspective (Alli. 2008; ILO. 2013) and a business and human rights perspective (Chan. 2012; Tromp.2016 and European Investment Bank. 2013).

access to prevention, promotion and protection against occupational risks; company or holding status, if linked to a differential access to compliance checks by relevant institutions (labour inspection, social security inspection, etc.).

- **Coping capacity:** identifies the strategies and resources that workers have to address consequences of risk occurrence. In particular, it is a matter of assessing access to care and compensation services in the event of an occupational accident or illness. Such incidences incur possible sanctions for the employer.

These three dimensions aim to capture a holistic way to view occupational risk vulnerability by looking at underlying factors. In particular, enforcement and access to prevention, promotion, protection (individual, collective, social) and compensation services are considered. This gives a greater understanding of the concept of vulnerability related to OSH risks. The present chapter describes the different profiles of safety and health vulnerabilities encountered within the lychee supply chain in Madagascar using the three dimensions mentioned above.

Casual agricultural workers and small producer

Production process

As soon as the lychee plot has more than three to four trees, producers tend to rely on agricultural workers for collection. To the extent that producers are small (two to three lychee trees), the harvest is usually completed by family members, whether paid or unpaid, on the family farm.

Harvesting is typically organized as follows:

- Each lychee tree has three workers in charge of the harvest, usually a man who climbs into the tree and two women who sort and pack fruits in *garaba*. *Garaba* are large bamboo baskets in which freshly cut *Ravenala* leaves are placed to keep lychees fresh.
- A supervisor or collector is in charge of assigning the roles and organizing the transport of *garaba* to either a collection point or directly to the truck, if on site, in the case of large farms.
- Once a number of *garaba* are ready, they are transported to the collection or transport point. The producer or producer group then sells to the collector (not certified) or loads them into the carrier's truck and accompanies the fruit to the treatment or transformation station. In this case, this is the point when the certified collector is paid.

Figure 23. *Garaba*



In general, to harvest lychee, almost no tools are used. The harvester climbs directly on the tree, which is often not maintained and therefore can be over 5 metres high, equipped with an empty *garaba* that he fills and sends down to the ground with a rope.

In the few existing plantations, men are assigned to the collection and women gather in a hangar for tailing and packing the fruit in crates. In plantations, tools are provided, such as ladders, and the trees are regularly pruned and therefore, shorter.

Exposure

The main occupational hazards identified at the harvest level include:

- **Fall from heights:** this risk is identified as the most serious, although its probability appears to be limited according to agricultural workers (no statistical data on accidents collected at the production phase). If a fall occurs, it can be very dangerous, as unmaintained trees are tall. Lychee is a brittle tree because of its Y-branching and when still young only a light person can climb without risk of breaking it. In this case, young workers are used.¹¹⁷

117 Producers and workers interviewed reported using children in these cases, with no specific age group defined.

- Fall and slips: linked to slippery and steep terrain (the lychee season is at the beginning of the rainy season).
 - Biological risks:
 - Insect bites, especially fly worms (with bee stings - *Anthophila* - type *Poliste* wasps - and mosquitoes - *Culicidae*) are reported frequently.
 - Dirty or non-drinkable water: as mentioned above, certified producers are meant to offer access to a water source, which is an exception compared to other agricultural production sites in the region. Although no information has been found on water quality, access to quality drinking water in rural areas remains a frequent problem in Madagascar and there have been no indication from lychee producers of use of water filters. Sanitation facilities are limited with little access to modern latrines, however the water, during the lychee season, does not appear to be soiled.
 - Physical risks - sunlight and heat: Exposure to the sun is limited insofar as harvesting is done in the tree's shade. Most sun exposure takes place during the transportation of *garaba* to the collection point. Lychees are not harvested during the hottest season nor are lychees harvested in the rain because sulphur does not bind well to the wet fruit. However, temperatures remain high, as for any agricultural work in the region, it is important to ensure access to drinking water. Certified producers are among the few who do so.
 - Ergonomic risks – transport and handling of heavy loads: the *garaba*, when filled, weigh 20 to 30 kilograms and are carried on the back or shoulders, without tools to facilitate transport. The *garaba* have a bamboo structure that tends to hurt the wearer when it is filled and heavy. Small cuts are frequently reported.
 - Psychosocial risks: operators have reported that there are isolated cases of cardiovascular accidents each year, in particular when a farmer or a collector arrives late and is refused delivery at the entrance of the treatment station. This risk is aggravated, as explained, by those with little, if any, access to health care services and who do not receive regular medical or preventive check-ups.
- The exposure time for all of these risks is obviously very limited insofar as the season is short, which also limits the possible consequences. This is particularly true in regards to chronic diseases related to workstation ergonomics. The table below summarizes the main risks identified with the players. There is also a general risk mentioned by farmers regarding the security of their belongings, especially when they receive cash payment for lychees sold.

Figure 24. Main occupational hazards at production stage

Risk factors		Workers concerned	Severity	Probability	Ranking
Security	Falls from heights	Harvester (in the tree)	4 to 5	2	9
Security	Falls and slips	During <i>garaba</i> transport	1 to 2	3	3 to 6
Biological risk	Pest exposure	Harvester (in the tree, below the tree)	1	4	4
Biological risk	Unsanitary water exposure	All harvesters and possibly collectors during breaks.	2 to 3	3	6
Physical risk	Sun exposure	Harvesters during the transport of <i>garaba</i>	1	4	4
Physical risk	Heat exposure	Harvesters (in the tree, below the tree) and during <i>garaba</i> transport	1	3	3
Ergonomic risk	Heavy loads	Harvesters during <i>garaba</i> transport Collectors	2	4	8
Psychosocial risk	Cardiovascular accidents	Farmers and collectors	4 to 5	1	4 to 5

Source: authors based on collected information.

Severity: 1 / No work time lost, may require the use of the first-aid kit; 2 / Less than three days of inability to work; 3 / More than three days of inability to work; 4 / Major injury or severe disability; 5 / Invalidity or death.

Probability: 1 / Very unlikely, 2 / Unlikely, 3 / Probable, 4 / Very likely, 5 / Unavoidable.

Sensitivity

The sensitivity of casual agricultural workers and small producers to occupational risks is important. There are few control measures for the risks described above.

Measures to eliminate the risk of falls and loads imply modernization of production processes and using tools, which have not been possible to date. The lack of and irregularity of resources and limited knowledge at the producer level are key challenges to risk reduction. Although lychee revenues can represent 30 to 40 per cent of the producer's annual income, he or she does not have access to financial products to smooth out income over the year or financial education programs allowing for investments. Producers' saving capacity is also limited. This stage of production only captures about 10 per cent of the market value of lychees in Europe, thus constraining investment in modernization at this level of the value chain.

Young people are at risk of falling as they are called upon to harvest in young trees. Even established lychee trees can break easily so only a light person can climb up into the young ones. Harvesting young trees requires the worker to climb directly into the tree, thereby significantly increasing the risk of falling. No tools or protective gear is used due to lack of knowledge, resources and suppliers, which also increases risk. These young people are used on the spot and are often unpaid family members. The Malagasy Labour Code does not yet address unpaid, family work.

Control measures are also virtually non-existent. Awareness on control methods as well as risk perception are limited. Workers and producers are able to identify the risks they face, but living and working conditions in rural Madagascar are such that the need for, or the awareness of, the right to safe working conditions is not necessarily expressed. The absence of control measures increases the occurrence of risks, which for the most part would be relatively easy to eliminate or control.

The sensitivity to occupational risks is accentuated by the general health status of workers and producers. Access to health care and occupational health services in rural areas are limited in Madagascar. The fact that almost all workers at the production stage are both informal and temporary means they are ineligible for Madagascar's health and employ-

ment injury insurance schemes. These workers can use community health services, but those have limited human and financial resources that reduce both the geographical coverage and the overall quality of services.

Coping capacity

It is particularly difficult for casual agricultural workers, and small producers and their families, to cope with the physical and financial consequences of a work-related accident or illness. Insofar as their jobs are informal, they do not benefit from social protection coverage. Their geographical and financial access to health services is limited, as is their access to extension services (good agricultural practices, basic hygiene, etc.).

In the event of an accident, access to care is extremely restricted. At the certified sites, an emergency kit is provided, but medical facilities are often far from the production sites (apart from the few peri-urban sites around Toamasina). Since agricultural workers and small producers do not have access to sickness insurance or occupational risk insurance, they largely finance the costs incurred by any occupational accident or disease.

Gendered vulnerability patterns

Production process

Women involved in the lychee value chain are mainly concentrated at the production, treatment and processing stages. There is a clear division of labour according to gender. In terms of production, treatment and processing, women occupy a majority of positions involving the handling of fruit. At the production level, women are in charge of tailing and *garaba* packaging. Each lychee tree has three workers in charge of the harvest, usually a man who climbs into the tree and two women who sort, deck and put the fruit in *garaba*. In the few plantations, the work may be streamlined with the men assigned to the harvest and the women gathered in a hangar for the tailing and packing of fruit crates.

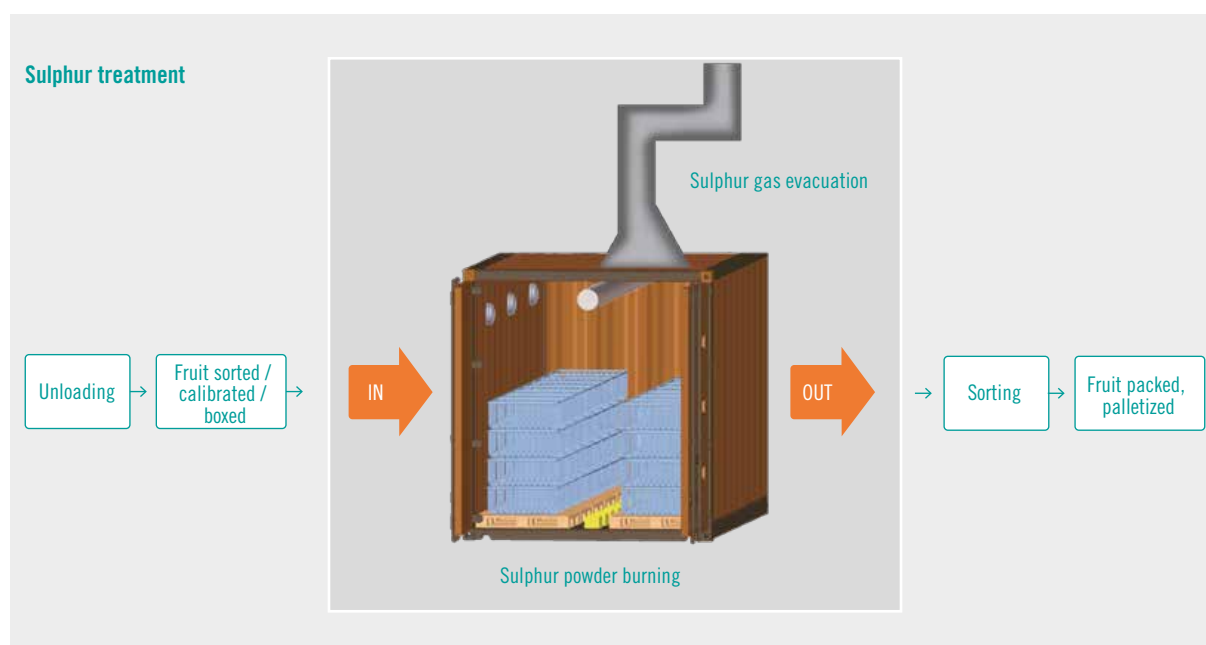
At the treatment stage, women hold jobs sorting fruit, which is usually done as fruit leaves the sulphur chamber. At the processing level, women occupy positions

preparing fruit and packing. Teams are divided into different workstations on a fixed basis (no rotation of posts) and there is a gendered division of labour (corresponding to workers' preferences at hiring stage).

Each workstation performs a series of operations. Once arrived at the treatment station, fruit destined to the fresh export market are:

- Unloaded;
- Sorted, calibrated, weighed (in some companies only);
- Sorted, calibrated, weighed (in some companies only);
- Put into boxes of 18 kilos, traced;
- Put into the sulphur chamber,¹¹⁸ exit the sulphur chamber;
- Sorted;
- Packed;
- Palletized;
- Loaded in trucks.

Figure 25. Sulphur chamber



Source: adapted from *Le Séchage Solaire à Petite Échelle des Fruits et Légumes* (GRET, 1996)

For processed lychees (canned, juice), after being unloaded, sized and weighed, the fruits are scalded, hand-pitted, packaged and sterilized. As this con-

cerns only a small part of the production, the risk analysis below focuses on fresh fruit.

¹¹⁸ Standard recommended usage is 600 grams per tonne of sulphur for transportation by sea, 400 grams per tonne for transportation by air. If the sulphur chamber is watertight and equipped with a powerful chimney, the gas released when the chamber is opened after treatment is limited to a minimum. The fruits release some gas when sorted and palletized.

Figure 26. Jobs at treatment level

Fonction	Dominant gender	Average proportion of total staff
Reception (unload, put into 18 kilo boxes)	Male	20%
Sulphur treatment	Male	5%
Cardboard preparation	Female	10%
Sorting	Female	20%
Packing	Male	10%
Cleaning	Mixed	5%
Traceability	Mixed	15%
Management	Mixed	10%
Other	not communicated	5%

Source: authors based on collected information.

Exposure

To the extent that women and men perform different jobs, exposure to occupational risks is also different. For women, specific risks are associated with food handling. Risks for women are mainly biological risks at the production stage and chemical risks at the treatment stage (sulphur dioxide in gas form). For men, as described above, the risks of falling and the risks associated with the transport of heavy loads are the most concerning.

At the production stage, men and women are vulnerable to the same risk factors regarding access to water and exposure to heat and sun, while some other risks are directly dependent on the gendered division of labour. In particular, women are in prolonged contact with fruits, which can lead to increased exposure to biological agents (bacteria, fungi, viruses, etc.). In comparison, men are at risk for falls (from the tree) and to ergonomic risks linked to the transport of heavy loads.

At the treatment and processing stage, men and women face the same risk factors related to the workstation (i.e. risks of fires, falling objects, etc.). The exposure differs, however, in the transport of heavy loads (function occupied by men) and sorting of product just after sulphur treatment (function occupied by women). As offered earlier, all of the stations are Global GAP certified with one exception and therefore comply with preventive and protective

measures to reduce vulnerabilities to some of the above risks, in particular:

- Access to a first aid kit;
- Access to a safety briefing at the beginning of the season;
- Marked workplace with security markings for each identified risk;
- Existence of a fire evacuation procedure and simulation exercises;
- Personal protective equipment (depending on the position);
- Affiliation to health insurance and occupational risk insurance for the duration of the contract;
- Medical visit at the beginning of the season (still a work in process for many stations).

Handling powdered sulphur, such as storage and use, is a priority, insofar as it is flammable and therefore a risk of fire exists.

The table below gives an overview of the main risks observed and reported in the treatment plant, given that additional risks exist depending on how each workstation is organized. Night work, the absence of job rotation and the length of the working day, often up to 12 hours, accentuate the probability of risk occurrence.

Figure 27. Main occupational hazards identified at treatment stage

Risk factors		Activity	Severity	Probability	Rank
Ergonomic risk	Heavy loads	Reception (unloading) and sulphur treatment (unloading of treated fruits in sorting mat) – positions dominated by males.	2	4	8
Chemical risk	Sulphur exposure ¹¹⁹	Sulphur chamber personnel Sorting after sulphur treatment – position dominated by females. ¹²⁰	5 1 to 2 ¹²¹	4 4	20 6
Security	Fall of objects	Preparation and storage of palletized cardboard. ¹²²	2	2	4
Security	Fire	All activities.	4 to 5	1	4

Source: authors based on collected information.

Caption:¹²³

Severity: 1 / No work time lost, may require the use of the first-aid kit; 2 / Less than three days of inability to work; 3 / More than three days of inability to work; 4 / Major injury or severe disability; 5 / Invalidity or death.

Probability: 1 / Very unlikely, 2 / Unlikely, 3 / Probable, 4 / Very likely, 5 / Unavoidable.

Sensitivity

Two factors reinforce the vulnerability of women to the specific risks they face: (i) limited access to occupational health services, including maternal and child health services, affecting their health at work; and (ii) limited access to specific infrastructure in the workplace and lack of job rotation.

The limited access to occupational health services mentioned above, especially for rural workers, affects women and their access to maternal and

child health services. This situation, coupled with the fact that most workplaces do not benefit from specific and adapted facilities (especially for pregnant and lactating women or for parents with young children), reinforces their vulnerability to the occupational risks to which they are exposed and may add to their stress level.

The influence of gender on labour roles is reflected in the absence of job rotation (at the production stage and at the treatment and processing stage). With prolonged working hours, the lack of rotation increases risk exposure. At the processing stage, working hours vary from one company to another, but the majority work 24 hours a day with a day and a night crew. Each crew generally works 12-hour shifts including a food break and breaks when carriers or collectors arrive.

119 NRS, Toxicological Data Sheets Database: "Acute exposure is responsible for severe respiratory disorders with pulmonary edema and bronchoconstriction. Non-specific bronchial hyperactivity may persist long after acute exposure. Chronic exposures are characterized by chronic bronchitis and pharyngitis. Exposure to this gas may also exacerbate pre-existing respiratory conditions. Current data do not allow sulfur dioxide to be considered a direct human carcinogen. "(...)" Sulfur dioxide produces severe irritation of the mucosa of the respiratory tract with cellular lesions and laryngotracheal and pulmonary edema. It causes severe irreversible damage to the skin and eyes. Repeated inhalation causes chronic bronchial involvement; In the case of ingestion, an alteration in the general condition of the animals is noted with diffuse organic damage. Hydrated derivatives (sulfurous acid or sulphites) can produce mutagenic and genotoxic effects in vitro. In vivo tests are negative. Sulfur dioxide is not classified as a carcinogen by the European Union. For IARC-IARC, it cannot be classified as to its carcinogenicity to humans (group 3). The data on fertility are not sufficient to conclude. A fetotoxic effect is noted in mice."

120 The staff working with sulphur chambers is also exposed but to a lesser extent because: (i) the possible contact lasts a short time; (ii) the risk is well identified and the personnel concerned is equipped with complete personal protections - suit, anti-sulphur filter mask renewed every year, safety shoes, gloves, goggles.

121 Low concentration.

122 Depending on the ergonomics of the workplace, sometimes this activity is performed in an upper floor.

123 ILO. (2013a)

Coping capacity

Adaptability when accidents or illnesses occur is often lower among women due to unequal pay at the production stage. In some cases, remuneration may be different for the functions of harvester, which is a predominantly male role and ginner or sorter often held by females. The latter is paid less. Remuneration received in exchange for work depends largely on geographical location. The closer the workplace is to Toamasina, the more agricultural workers have alternative options and therefore the bargaining power over their pay rate is often higher. The payment terms also vary with pay-for-performance practices more commonly found in remote areas. In the case of performance payments, no minimum income is guaranteed. For fixed daily payments, often practiced in peri-urban areas, the income is close to the minimum agricultural wage imposed by the law. Insofar as these peri-urban workers have more alternatives and thus greater bargaining power, higher wages can sometimes be secured. Access to social security benefits for sickness, maternity or occupational accidents for workers in treatment and processing stations including access to medical care (occupational health services and general medicine) is inconsistent. Workers are covered only for the duration of their contract. It seems that for female workers this one of the few formal job options that exist.

Given the weak organization of workers at all levels of the supply chain, it is difficult for workers, and in particular, the most vulnerable workers among which women are highly represented, to request specific consideration of the occupational risks they face.

Vulnerability is linked to seasonality of employment. Occupational risks are exacerbated by the short lychee season. Occupational risks identified above are reinforced at all levels of the supply chain. Three main consequences are:

- i) Weak capacity / professionalization of economic actors (farmers, harvesters, management, workers);
- ii) Lack or inconsistent access to social protection linked to the seasonality of contracts;
- iii) Weakness of collective organization and a productive social dialogue on hazards.

Capacities and professionalization

As mentioned in the previous sections, identified risks in the supply chain are related to a low level of professionalization, which involves a lack of equipment (especially at the stage of production) and limited knowledge and awareness of occupational risks. This combination acts as a constraint against adopting appropriate control measures. Despite some initiatives to strengthen capacity, regarding work safety, basic hygiene measures, and good production processes, results remain mixed. High staff turnover (only about half of seasonal station workers return the following year), and the lack of investments in human resources, given the short duration of the lychee season, compounds the problem. Few incentives exist for employers and producers to support greater value distribution within the supply chain. While some lack the financial means or backing to do so, others simply cite the short duration as a reason not to invest.

Discontinuity of protection

As mentioned, jobs at the production stage are informal and therefore enjoy little protection, medical surveillance or training on occupational risks.

At the transport, treatment and processing stage, the majority of jobs are "non-standard". These are seasonal jobs and therefore the protection granted by the Labour Code is less than that granted to permanent workers.

Treatment station workers benefit from more employment-related protection than farm workers and producers. All but one of the stations are Global GAP certified, which means they are regularly audited. The certification module includes compliance with legal obligations in the area of labour law. As a result, station workers are formalized, have employment contracts, receive payment for overtime and are affiliated to social security (CNAPS and for some workplaces OMSI) for the duration of their contract. Wages vary from one company to another, but the total remuneration is on average twice the minimum wage. This does not necessarily mean that the hourly rate is higher than the minimum wage, as in many cases it is related to the number of hours worked (12-hour shifts) and night work. Protection for station workers is limited by the very short dura-

tion of their employment contract. Again, while station workers are affiliated to the social security system for the duration of their short-term contract, continuity of access to medical care (occupational health services and general medicine) as well as benefits in the event of sickness, maternity or accident at work are not guaranteed throughout the year.

Lack of collective organization

Finally, women and men who work in the lychee supply chain are poorly organized. There are no unions or structures organizing or engaging in social dialogue. In this context, workers, and particularly the most vulnerable among which are women, have difficulty making their voices heard and demanding specific considerations based on the occupational risks they face.

Vulnerability of surrounding communities due to waste management practices

The potential impact of surrounding communities of sulphur exposure, if identified as a workplace risk, exists, in particular the release of SO₂ gases via station chimneys and via waste management. Both empty bags of sulphur powder and lychees freshly treated with sulphur, but sorted out, are thrown away outside treatment stations. Concerning this last point, during the season it is possible to see locals collecting the discarded fruit (treated with sulphur) by hand, and without protection, in order to resell these fruits on the local market.

This is in line with a more general phenomenon of inadequate waste management at the collection, processing and processing stages, due to limited incentives to adopt good environmental practices.

3.2. Opportunities for intervention

Considering incentives and constraints for OSH as well as vulnerability in the lychee value chain, several objectives could be set to improve the competitiveness of the value chain and its OSH outcomes. Interviews carried out downstream the chain, with distributors and certification bodies reveal that OSH is an important and increasing part of the standards imposed by purchasers to their supply chain, both for reasons of consumers' expectations and food safety regulations. The trend is towards increasing demand for compliance throughout the supply chain. Thus, the implementation of advanced occupational risk management systems in line with ILO instruments contributes to this market requirement and anticipates new market trends (GRASP certification and others).

Control of hazards at the level of farmers and agricultural workers

Reducing occupational risks during harvesting season for farmers and agricultural workers requires the adoption of production standards and support for their implementation to include training, and co-financing mechanisms. These standards should address, in particular, the following aspects: height of trees, minimized through regular maintenance and pruning, use of tools, the size and weight of *garaba*, access to clean drinking water near production sites, and access to necessary first aid equipment. These elements are in line with sections AF 4.1 and 4.4 of Global GAP (OSH risk assessment, clothing and protective equipment). The interventions detailed below could help achieve this result:

- **Training** of farmers and agricultural workers, preferably through existing mechanisms (cooperatives, smallholder groups, regular contacts between farmers and exporters). A training plan could span

over several seasons and include key elements facilitating both OSH improvement and compliance with Global GAP and GRASP. Basic training in OSH and good agricultural practices could incorporate the use of new rope and hand pruning shears when pruning trees, and the use of smaller *garaba*, in agreement with exporters. Training in the assessment of the producer's occupational hazards and basic farm-level changes would also be important.

■ Program for the **adaptation of production sites:**

- Replanting and pruning plan with the producers of the sector. In order to link the good practice and economic performance, the industry could adopt differentiated remuneration practices (separate pricing) based on quality and for calibration at the entry station.
- Widespread adoption of smaller *garaba* and maintenance of access roads.
- Sustainable funding and procurement mechanisms for equipment (first aid kit, basic tools for pruning and harvesting, water supply mechanisms, smaller *garaba*), in connection with the Global GAP provisions on hygiene (water points and supply of drinking water) and safety (emergency kits).
- Pre-harvest **prevention campaign** and recording of incidents and accidents at the production stage. There is the possibility of doing so via mobile applications insofar as some treatment stations already use this method to pay farmers.
- **Organization** of farmers, with a promotion and potentially an incentive (engagement with exporters) to group in cooperatives and associations, which could serve as channels for dissemination of good production practices and certification.
- **Capitalize** on productivity gains and improved (safer) working methods on other crops (pepper, clove ...) in order to reinforce the sustainable adoption of new practices.

The potential for **technical and potentially financial support from international purchasers** from importers to end buyer on items 3.2.1 and 3.2.2. This could be discussed and evaluated to the extent that these practices already exist in the value chain.

Control of hazards at treatment and processing plants

Eliminating and reducing occupational hazards in processing and processing plants requires strengthening the capacity to implement an OSH management system in line with ILO instruments and in particular ILO-OSH 2001 guidelines. The sustainability of risk management practices also depends on the ability to relate productivity gains and the strengthening of links with institutional support structures. The interventions detailed below could help achieve this result:

- Implement **prevention and information activities** at the station before each season, in collaboration with the organizations in charge (CNAPS, OMSI), adapted to the risks and needs of treatment and processing stations. This would facilitate the application of GRASP points 4 and 8, where there is provision for awareness-raising on the national regulations in force for the personnel responsible at the lychee treatment stations, but also at the producer level (with proof of attendance).
- Review the **ergonomics and arrangements of workplaces and processes**. (Collective Protective Equipment such as unloading ramps, but also practical changes such as sorting before sulphur treatment to reduce chemical exposure, rotating stations, the use of shorter shifts and the avoidance of night work, especially at peak hours) and measure productivity gains. Adjusting work shifts is aligned with GRASP compliance point 11 (see in bibliography Global GAP and GRASP referential) regarding a maximum of 60 working hours per week. Measuring and documenting the links between productivity and the reduction of risk factors is key to establishing additional, sustainable good practices and facilitating their adoption.
- **Share good practices** amongst the different players in the sector and other sectors via existing structures, such as the GEL, and the adoption of OSH, good practice charters. Establish a dialogue between the different supply chains in the production area (pepper, clove, etc.) to share good practices and reduce compliance costs.
- Ensure the implementation of **annual health checks** in collaboration with OH services (OMSI). This point corresponds to compliance with the Global GAP, point CB 7.8.1.

- Strengthen the capacity of actors and their **subcontractors** (transport) to reduce and manage risk together (in particular with regard to road safety and regulation of the quantities transported). This reflects the Global GAP compliance point QM 10.
 - Strengthen the **occupational risk identification and management systems** in line with ILO-OSH 2001 (ILO, 2001), in particular to strengthen the capacity of stakeholders to create participatory risk management (management - workers) mechanisms. This links sections AF 4.1 and 4.4 of the Global GAP framework.
 - Develop a strategy with supply chain players to create / include **OSH focal points and advisory services** within work teams and business service providers. Evaluate the feasibility of providing these services to other related supply chains. Create a pool of public-private expertise on key prevention issues that can also involve and benefit other agri-food value chains.
 - The potential for **technical and potentially financial support from international purchasers** from importers to end buyer on items 3.2.1 and 3.2.2 could be discussed and evaluated to the extent that these practices already exist in the value chain.
- Coordination and effective implementation of support functions for the promotion, prevention, protection and compensation of occupational risks***
- Reducing factors that increase vulnerability to occupational hazards within the value chain and, in particular, at the first levels of production require access to support functions in the promotion, prevention, protection and compensation of occupational risks. Organizations such as CNAPS and OMSI, as well as the Ministry of Health mandate these support functions. The interventions detailed below could help achieve this result:
- Implement **prevention and information actions** on OSH and labour legislation jointly by CNAPS and OMSI at the treatment and processing stations and then at the level of the farmers' groupings. Coordinate access to prevention, promotion and protection services (OMSI, CNAPS, external service providers).
 - Strengthen the **capacity of occupational health services** to: (i) ensure the affiliation of temporary workers, and (ii) respond to the seasonal flow of workers from treatment and processing plants, specifically concerning annual check-ups, which relates to compliance with GlobalGAP CB 7.8.1.¹²⁴
 - Find appropriate solutions (feasibility study, monitoring, monitoring and evaluation) to promote **prevention services for the rural economy**: itinerant preventive health services, training of rural extension services to occupational risks, etc. Explore options for public-private partnerships in strengthening capacities for geographical access to prevention services (e.g. extension services, roving services, etc.) for the lychee and other chains with the same production base (pepper, clove, mango ...).
 - Study the **feasibility** of an appropriate legal and administrative framework to ensure the continuity of social protection coverage and medical follow-up of seasonal formal workers for the rest of the year. This could be done in support of the government's current work on the social protection of rural workers and a pilot proposal could be made for the Toamasina production area. This should also include a simplification of the administrative procedures for affiliation and registration for rural populations.¹²⁵

Formulation and implementation of an agri-food export competitiveness policy integrating OSH compliance as a key factor

The following activities could be carried out in connection with the various agro-food supply chains of the country that can benefit from the experience of the lychee industry (vanilla, pepper, clove, etc.):

- Develop a **strategic vision** with the relevant ministries (labour, health, agriculture, trade) on the

124 "Does the producer offer all employees in contact with plant protection products to undergo annual health examinations or at a frequency appropriate to a risk assessment that takes account of their exposure and the toxicity of the products used?"; therefore an annual health check for at least agents working directly in contact (manipulations) with sulphur.

125 In connection with the constraints specific to the rural world in Madagascar the registration of births and the renewal of identity papers for example are not always the rule. Moreover, what emerges on this point from the application of GRASP is that at the level of the production plots those administrative difficulties further complicate the formalization of seasonal workers.

competitiveness of agricultural sectors including improving safety and health at work to overcome barriers to increasing market entry requirements. This could be done in conjunction with the recent adoption of the National Plan of Action for the Promotion of Decent Work in the Rural Economy.

- Strengthen the Ministry of Labour's capacity to **formulate and implement a compliance strategy** that takes into consideration the priorities, opportunities and possible partners to strengthen workplace compliance with existing regulations. In this context, identify those parts of the **legal framework** that could be reviewed (in particular strategies for the protection of minor unpaid family workers)¹²⁶ and fortify exchanges with private compliance initiatives within the strategic planning of the Ministry of Labour and its Inspection.
- Strengthen coordination mechanisms and institutional capacity of the ministries concerned to **integrate prevention, promotion and compensation services** (especially in the context of improving the social protection of rural workers). See how current funding and service provision mechanisms can be improved and how to mobilize public-private partnerships.
- Initiate work with **Global GAP** on the points of reference, which could be clarified or better adapted to professional conditions and sector risks. Specifically, considerations in relation to national legislation are assessment of occupational risks, requirements on work hardship (rotation), registration of accidents and incidents, risks related to road safety, subcontracting, work of minors, documentation of employment contracts and the minimum wage.

126 In practice, there may sometimes be the employment of teenage workers to help during the harvest, mostly in the family (in connection with GRASP item 8). In theory, the authorization of the Labour Inspector would be required for each case, which is very complicated for the time being in rural areas. For those companies that have implemented GRASP, no employed minors under 15 years of age has been declared or observed. However, this represents the "GlobalGAP" plots, so a small percentage of plots for now.

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